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(54) SELF-ADHESIVE COMPOSITION AND SELF-ADHESIVE ARTICLE

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain an acrylic self-adhesive compsn. excellent in heat resistance and adhesion to a substrate foam by compounding an acrylic copolymer obtd. mainly from an alkyl (meth)acrylate with a tackifying resin and an isocyanate- based crosslinker.

SOLUTION: An acrylic copolymer of 100 pts.wt. obtd. by the free-radical copolymn. of 59.5-98.99wt.% alkyl (meth)acrylate (X1) having a 2-18C alkyl group, 0.01-0.5wt.% hydroxylated vinyl monomer (X2) free-radical-copolymerizable with X1, 1-10wt.% polymerizable



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the adhesion workpiece using an acrylic binder constituent and it excellent in the adhesion to a foam base material, and thermal resistance.

[0002]

[Description of the Prior Art] As for adhesion workpieces, such as adhesive tape and a pressure sensitive adhesive sheet, what carried out the laminating of the binder constituent on the surface of the base material, and was used as a pressure sensitive adhesive double coated tape, foam adhesive tape, etc. is common, and they are broadly used for the application of building materials, home electronics, the shock absorbing material for automobiles, a crevice tape, etc.

[0003] Many solvent mold binder constituents which make acrylic resin a subject as such a binder constituent for adhesion workpieces at a point excellent in weatherability, endurance, thermal resistance, cold resistance, a water resisting property, etc. are used. In recent years, the more advanced thing also about many properties of the acrylic binder constituent used is required with application expansion of such an adhesion workpiece.

[0004] Since a base material is porosity, the adhesive tape which uses various rubber system foam as a base material is difficult for carrying out direct coating of the binder constituent solution to a foam base material, and after once carrying out coating of the binder constituent solution to a release paper etc. and drying, generally the manufacture approach which carries out a sticking-by-pressure imprint is performed to the foam base material. However, when this approach is used for a base material with large expansion ratio, such as urethane foam, the adhesion area by imprint runs short and there are troubles, like the adhesion to the foam base material of a binder constituent layer becomes low.

[0005] In the acrylic binder constituent which contains an acrylic polymer and a tackifier as a principal component in JP,3-281587,A Although it is indicated that the acrylic binder constituent with which a tackifier makes resin acid and polyhydric alcohol react, and is obtained and whose hydroxyl values of this resin acid ester it is resin acid ester and are 50-100 is excellent in many properties This acrylic binder constituent runs short of the adhesion area by imprint, when it is used for a base material with large expansion ratio, such as urethane foam, and the adhesion to a base material becomes low.

[0006] Although there was the approach of lowering the elastic modulus of a binder constituent desiccation coat by adding the low tackifier of a liquefied component or softening temperature simply to an acrylic binder constituent as an approach of solving the above-mentioned trouble, by this approach, there was a fault of the thermal resistance of a binder constituent falling.

[0007]

[Problem(s) to be Solved by the Invention] This invention aims at offering the acrylic binder constituent which was excellent in the adhesion to the base material of high expansion ratio, and was excellent in thermal resistance, and the adhesion workpiece using it in view of the above.

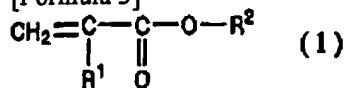
[0008]

[Means for Solving the Problem] A binder constituent (henceforth "this invention 1") according to claim

1 contains a hydroxyl group in 59.5 - 98.99 % of the weight (X-1) of acrylic-acid alkyl ester monomers whose carbon numbers of an alkyl group are 2-18 (meta), and a molecule, and is the above-mentioned (meta) acrylic-acid alkyl ester monomer (X-1), 0.01 - 0.5 % of the weight (X-2) of vinyl system monomers in which radical copolymerization is possible, and the following general formula (1).;

[0009]

[Formula 3]



[0010] (R1 expresses hydrogen or a methyl group among a formula.) R2 Weight average molecular weight is 2000-50,000, and the non-polymerization nature polymer whose glass transition temperature is -30 degrees C or less is expressed. 1 - 10 % of the weight of polymerization nature polymers expressed, And the acrylic (copolymer A) 100 weight section obtained by carrying out radical copolymerization of the above-mentioned (meta) acrylic-acid alkyl ester monomer (X-1) and the 0 - 30 % of the weight (X-3) of the vinyl system monomers which can be copolymerized, softening temperature -- 120 - 145 -- degree C -- it is -- a tackifier -- (-- B --) -- two - 30 -- weight -- the section -- a list -- an isocyanate cross-linking agent -- (-- C --) -- 0.01 - five -- weight -- the section -- from -- becoming -- ethyl acetate -- receiving -- insoluble matter -- a rate -- 20 - 50 -- % of the weight -- it is -- things -- the description -- ** -- carrying out -- a thing -- it is .

[0011] A binder constituent (henceforth "this invention 2") according to claim 2 is characterized by becoming the acrylic copolymer 100 weight section according to claim 1, the rosin ester system tackifier (B-1) 2 which is 120-160 degrees C of softening temperatures - 20 weight sections, the liquefied tackifier (B-2) 0.1 - 5 weight sections, and a list from an isocyanate cross-linking agent 0.01 - 5 weight sections.

[0012] A binder constituent (henceforth "this invention 3") according to claim 3 Are a binder constituent according to claim 1 or 2, and an acrylic copolymer (A) makes an initiator the peroxide (Z) which has two or more peroxy association in a monad. The mixture of either the following monomer mixture (X) or monomer mixture (Y) is added, and the first step of polymerization is performed. Subsequently It is characterized by being obtained by adding the monomer mixture (X) which was not used for this by the first step of polymerization, or (Y), and performing the second step of polymerization.

[0013] 59.5 - 98.99 % of the weight (X-1) of acrylic-acid alkyl ester monomers whose carbon numbers of an alkyl group of monomer mixture (X) are 2-18 here (meta), A hydroxyl group is contained in a molecule. An acrylic-acid alkyl ester monomer (X-1) and 0.01 - 0.5 % of the weight (X-2) of vinyl system monomers in which radical copolymerization is possible, It consists of the above-mentioned (meta) acrylic-acid alkyl ester monomer (X-1) and 0 - 30 % of the weight (X-3) of vinyl system monomers in which radical copolymerization is possible.

[0014] Monomer mixture (Y) consists of 70 - 100 % of the weight (Y-1) of acrylic-acid alkyl ester monomers whose glass transition temperature when considering as a homopolymer is -30 degrees C or less (meta), and the above-mentioned (meta) acrylic-acid alkyl ester monomer (Y-1) and 0 - 30 % of the weight (Y-2) of vinyl system monomers in which radical copolymerization is possible.

[0015] A binder constituent according to claim 4 is a binder constituent according to claim 1 to 3, and weight ratio [of monomer mixture (X) and monomer mixture (Y)] (X)/(Y) is used by 70-99/30. [1-30]

[0016] An adhesion workpiece according to claim 5 is characterized by coming to carry out the laminating of at least one sort to other goods of a binder constituent according to claim 1 to 4.

[0017] This invention is explained in full detail below. It is not limited especially as an acrylic-acid (meta) alkyl ester monomer (X-1) which constitutes an acrylic copolymer (A), for example, an ethyl acrylate (meta), acrylic-acid (meta) n-butyl, 2-ethylhexyl acrylate (meta), acrylic-acid (meta) n-octyl, acrylic-acid (meta) iso octyl, acrylic-acid (meta) lauryl, etc. are mentioned. Acrylic-acid (meta) n-butyl, 2-ethylhexyl acrylate (meta), etc. are used suitably.

[0018] Moreover, it is not limited especially as a vinyl system monomer (X-2), for example, acrylic-acid (meta) 2-hydroxyethyl, 2-hydroxypropyl acrylate (meta), acrylic-acid (meta) 2-hydroxy butyl, etc. are mentioned.

[0019] The polymerization nature polymer expressed with a general formula (1) is a macro monomer, has the acrylate (meta) radical of polymerization nature at one end, and is the polymer segment R2 of non-polymerization nature to the end of another side. It has.

[0020] Above R2 The non-polymerization nature polymer segment with which it is expressed is weight average molecular weight 2000-50,000, and glass transition temperature is -30 degrees C or less. If weight average molecular weight becomes small too much, it will become small too much to the elastic modulus of a hot binder constituent, and thermal resistance and creep resistance will fall. Moreover, since the reactivity of a polymerization nature polymer will fall if weight average molecular weight becomes large too much, it is limited to the above-mentioned range. It is 3000-20,000 preferably. Furthermore, when glass transition temperature exceeds -30 degrees C, the elastic modulus of the binder constituent in ordinary temperature is large, and since the adhesion to a foam base material falls, it is limited to the above-mentioned range.

[0021] Non-polymerization nature polymer segment R2 As a suitable thing, Pori n-butyl acrylate, Pori 2-ethylhexyl acrylate, etc. are mentioned, for example.

[0022] It is not limited especially as the above-mentioned vinyl system monomer (X-3), for example, a methyl acrylate (meta), acrylic-acid (meta) benzyl, acrylic-acid (meta) cyclohexyl, acrylic-acid (meta) isobornyl, acrylamide (meta), acrylonitrile (meta), N-vinyl pyrrolidone, vinyl acetate, styrene, an acrylic acid (meta), a maleic anhydride, an itaconic acid, a crotonic acid, etc. are mentioned.

[0023] (Meta) Since cohesive force will decline and thermal resistance and creep resistance will worsen if a tack falls that an acrylic-acid alkyl ester monomer (X-1) is less than 59.5 % of the weight and it exceeds 98.99 % of the weight, it is limited to the above-mentioned range. Since it becomes that a vinyl system monomer (X-2) is less than 0.01 % of the weight constructing a bridge inadequate, and thermal resistance and creep resistance fall, a bridge will be constructed too much if it exceeds 0.5 % of the weight, and a tack and adhesion decline, it is limited to the above-mentioned range.

[0024] Since an elastic modulus [in / that a polymerization nature polymer is less than 1 % of the weight / ordinary temperature] is high, the adhesion to a foam base material falls, and thermal resistance will fall in order to make it fall greatly to a hot elastic modulus if it exceeds 10 % of the weight, it is limited to the above-mentioned range. Since a binder constituent will become hard and a tack and adhesion will decline if a vinyl system monomer (X-3) exceeds 30 % of the weight, it is limited to the above-mentioned range.

[0025] this invention -- one -- a binder -- a constituent -- the above -- acrylic -- a copolymer -- (- A -) - 100 -- weight -- the section -- softening temperature -- 120 - 145 -- degree C -- it is -- a tackifier -- (- B -) -- two - 30 -- weight -- the section -- and -- an isocyanate cross-linking agent -- (- C -) -- 0.01 - five -- weight -- the section -- from -- becoming .

[0026] The softening temperature of the above-mentioned tackifier (B) is 120-145 degrees C. Since the elastic modulus near the ordinary temperature of a binder constituent will become high and the adhesion to a foam base material will fall if the elastic modulus near the elevated temperature of a binder constituent is low, thermal resistance is bad in it being less than 120 degrees C and it exceeds 145 degrees C, it is limited to the above-mentioned range. It is 125-140 degrees C preferably.

[0027] Although it is not limited especially as a tackifier (B) but rosin system resin, terpene phenol system resin, petroleum resin, etc. are mentioned, rosin system resin is suitably used from the point of excelling in the balance of adhesion physical properties. For example, super ester A100 (the Arakawa chemical-industry company make, 100 degrees C of softening temperatures), super ester A115 (the Arakawa chemical-industry company make, 115 degrees C of softening temperatures), super ester A125 (the Arakawa chemical-industry company make, 125 degrees C of softening temperatures), the pen cel D125 (the Arakawa chemical-industry company make, 125 degrees C of softening temperatures), the pen cel D135 (the Arakawa chemical-industry company make, 135 degrees C of softening temperatures) the pen cel D160 (the Arakawa chemical-industry company make, 160 degrees C of softening

temperatures), etc. be mentioned These resin may be used independently and may use two or more kinds together. When using two or more kinds together, average softening temperature (formula: σ (softening temperature x number of copies)/ σ number of copies) should just be in the above-mentioned range.

[0028] The loadings of a tackifier (B) are 2 - 30 weight section to the above-mentioned (copolymer A) 100 weight section. [acrylic] Since adhesion [as opposed to / that they are under 2 weight sections / an olefin] worsens, the adaptability to various adherends falls, and thermal resistance will fall if 30 weight sections are exceeded, it is limited to the above-mentioned range. It is 5 - 20 weight section preferably.

[0029] The isocyanate prepolymers which will not be limited as an isocyanate cross-linking agent (C) especially if it has two or more isocyanate radicals in a molecule, for example, polyols, such as trimethylol propane and pentaerythritol, and the poly isocyanates, such as TORIECHI range isocyanate, diphenylmethane diisocyanate, and hexamethylene di-isocyanate, are made to react on the conditions that an isocyanate radical is superfluous, and are obtained are mentioned. Specifically, the Sumitomo Bayer urethane company make, Coronate L, isocyanate 0817, Sumi Joule N-3500, and Desmodur Z-4370 grade are mentioned.

[0030] The loadings of an isocyanate cross-linking agent (C) are 0.01 - 5 weight section to said acrylic (copolymer A) 100 weight section. Since bridge formation will progress too much, a gel molar fraction will exceed 50 % of the weight and the tack and adhesion over polyethylene foam will decline if it becomes being under the 0.01 weight section constructing a bridge inadequate, thermal resistance falls and 5 weight sections are exceeded, it is limited to the above-mentioned range. It is 0.01 - 3 weight section preferably.

[0031] A softener, a plasticizer, a thickener, a CHIKUSO agent, an extending agent, a bulking agent, a pigment, a stabilizer, an antioxidant, an ultraviolet ray absorbent, a rust-proofer, etc. may be blended with the binder constituent of this invention if needed in the range which does not check the effectiveness of this invention.

[0032] The binder constituent of this invention 1 **** adhesion which was excellent to porosity base materials, such as urethane foam with large expansion ratio, without being able to lower the elastic modulus in ordinary temperature, without lowering a hot elastic modulus not much, and reducing thermal resistance and creep resistance by that cause, since the tackifier whose softening temperature is 120-145 degrees C is blended with the acrylic copolymer of the structure in which the polymerization nature polymer segment whose glass transition temperature is -30 degrees C or less carried out graft polymerization. Moreover, since the bridge is moderately constructed with the isocyanate cross-linking agent, the outstanding thermal resistance and creep resistance are ****(ed).

[0033] The softening temperature of the rosin ester system tackifier (B-1) used by this invention 2 is 120-160 degrees C. Since the elastic modulus of the binder constituent in ordinary temperature will become high and the adhesion to a foam base material will fall if the elastic modulus of a binder constituent [in / that it is less than 120 degrees C / an elevated temperature] is low, and thermal resistance is bad and exceeds 160 degrees C, it is limited to the above-mentioned range. It is 125-150 degrees C preferably.

[0034] It is not limited especially as a rosin ester system tackifier (B-1), but the ester of derivatives, such as resin acid, such as an abietic acid, or a dimer of those, a disproportionation object, and a water garmish, a glycerol, pentaerythritol, etc., etc. is mentioned. For example, super ester A100 (the Arakawa chemical-industry company make, 100 degrees C of softening temperatures), super ester A115 (the Arakawa chemical-industry company make, 115 degrees C of softening temperatures), super ester A125 (the Arakawa chemical-industry company make, 125 degrees C of softening temperatures), the pen cel D125 (the Arakawa chemical-industry company make, 125 degrees C of softening temperatures), the pen cel D135 (the Arakawa chemical-industry company make, 135 degrees C of softening temperatures), the pen cel D160 (the Arakawa chemical-industry company make, 160 degrees C of softening temperatures), etc. be mentioned These resin may be used independently and may use two or more kinds together. When using two or more kinds together, average softening temperature (formula: σ (softening temperature x number of copies)/ σ number of copies) should just be in the above-

mentioned range.

[0035] The loadings of a rosin ester system tackifier (B-1) are 2 - 20 weight section to the above-mentioned (copolymer A) 100 weight section. [acrylic] Since adhesion [as opposed to / that they are under 2 weight sections / an olefin] worsens, the adaptability to various adherends falls, and thermal resistance will fall if 20 weight sections are exceeded, it is limited to the above-mentioned range. It is 5 - 15 weight section preferably.

[0036] As a liquefied tackifier (B-2), especially if liquefied at ordinary temperature and ordinary pressure, it will not be limited, for example, rosin ester system resin, terpene phenol system resin, xylene-formaldehyde system resin, etc. are mentioned, and rosin ester system resin is used suitably especially. for example, super ester L (the Arakawa chemical-industry company make) -- a stevedore -- light ester 3 (Hercules make) etc. is mentioned.

[0037] The loadings of a liquefied tackifier (B-2) are 0.1 - 5 weight section to the acrylic (copolymer A) 100 weight section. Since thermal resistance will fall if adhesion [as opposed to / that it is under the 0.1 weight section / a foam base material] is inadequate and 5 weight sections are exceeded, it is limited to the above-mentioned range. It is 0.5 - 3 weight section preferably.

[0038] In the binder constituent of this invention 2, the class of the acrylic (copolymer A) acrylic-acid (meta) alkyl ester monomer (X-1), a vinyl system monomer (X-2), a polymerization nature polymer, a vinyl system monomer (X-3), and the above-mentioned isocyanate cross-linking agent (C) and the presentation are the same as that of what was explained in full detail by this invention 1.

[0039] The binder constituent of this invention 2 to the acrylic copolymer of the structure in which the non-polymerization nature polymer segment whose glass transition temperature is -30 degrees C or less carried out graft polymerization Since optimum dose combination of the rosin ester system tackifier and liquefied tackifier whose softening temperature is 120-160 degrees C is carried out, respectively Adhesion which was excellent to porosity base materials, such as urethane foam with large expansion ratio, is ****(ed) without being able to lower the elastic modulus in ordinary temperature and reducing thermal resistance and creep resistance by that cause, setting up a hot elastic modulus low. Moreover, the thermal resistance and creep resistance which were excellent since the bridge was moderately constructed with the isocyanate cross-linking agent are ****(ed).

[0040] As a peroxide (Z) which has two or more peroxy association in the monad as an initiator used for the polymerization of an acrylic copolymer (A) with the binder constituent of this invention 3 For example, 2, the 5-dimethyl -2, 5-JI (2-ethylhexyl peroxy) hexane, 1 and 1-screw (t-hexyl peroxy) - 3, 3, a 5-trimethyl cyclohexane, The 1 and 1-screw (t-hexyl peroxy) cyclohexane, 1, and 1-screws (t-butylperoxy) 3 and 3, a 5-trimethyl cyclohexane, 1 and 1-screw (t-butylperoxy) cyclohexane, 1, and 1-screw (t-butylperoxy) cyclo dodecane, 2, the 5-dimethyl -2, 5-(m-toluy) peroxy) hexane, 2, the 5-dimethyl -2, 5-JI (benzoyl peroxy) hexane, 2 and 2-screw (t-butylperoxy) butane, n-butyl -4, 4-screw (t-butylperoxy) valerate, A 2 and 2-screw (4 and 4-G t-butylperoxy cyclohexyl) propane, 1, and 1-G t-butylperoxy-2-methylcyclohexane, [0041] A G t-butylperoxy trimethyl horse mackerel peat, screw (t-butylperoxy)-alpha-n-butyl SUBERETO, screw (t-amyl peroxy)-alpha-n-butyl SUBERETO, screw (t-hexyl peroxy)-alpha-n-butyl SUBERETO, screw (1, 1, 3, and 3-tetramethylbutylperoxy)-alpha-n-butyl SUBERETO, JIKUMIRU peroxy-alpha-n-butyl SUBERETO, etc. are mentioned.

[0042] Since a block copolymer is easy to be obtained by the two-step polymerization and it excels also in the thermal resistance of a binder constituent, and the adhesion to a foam base material when what has two or more kinds of peroxy association from which decomposition temperature differs among the above is used, it is desirable. Have suitably peroxy association from which 10 degrees C or more of reduction-by-half temperature differ for 10 hours. A 1 and 1-G t-butylperoxy-2-methylcyclohexane, a G t-butylperoxy trimethyl horse mackerel peat, Screw (t-butylperoxy)-alpha-n-butyl SUBERETO, screw (t-amino peroxy)-alpha-n-butyl SUBERETO, Screw (t-hexyl peroxy)-alpha-n-butyl SUBERETO, screw (1, 1, 3, and 3-tetramethylbutylperoxy)-alpha-n-butyl SUBERETO, and JIKUMIRU peroxy-alpha-n-butyl SUBERETO are used.

[0043] It is the same as the acrylic-acid (meta) alkyl ester monomer (X-1) which constitutes monomer mixture (X), a vinyl system monomer (X-2), and (X-3) the thing stated by said this invention 1.

[0044] As for the acrylic-acid alkyl ester monomer (Y-1) which constitutes monomer mixture (Y) and whose glass transition temperature is -30 degrees C or less (meta), the same thing of a monomer (Y-1) and the vinyl system monomer (Y-2) in which radical copolymerization is possible as the above-mentioned monomer (X-1) is the same as that of the above-mentioned vinyl system monomer (X-3) again.

[0045] Although especially the approach of the radical copolymerization in a two-step polymerization is not limited, since combination and coating of a binder constituent are usually performed in the state of a solution, a solution polymerization method is suitable for them. It is not limited especially as a solvent used by solution polymerization, for example, alicyclic group system solvents [, such as an aliphatic series system solvent; cyclohexane,], such as acetic-ester system solvent; n-hexanes, such as ketones; methyl acetate, such as aromatic solvent; acetones, such as benzene, toluene, and a xylene, and a methyl ethyl ketone, ethyl acetate, and butyl acetate, and n-heptane, etc. are used.

[0046] In order to adjust molecular weight in solution polymerization, a suitable chain transfer agent may be used. As a chain transfer agent, dodecyl mercaptan etc. is mentioned, for example. In this case, as for the weight average molecular weight of an acrylic copolymer (A), it is desirable to make it set to 300,000-2 million. Cohesive force is insufficient in it being less than 30, thermal resistance and creep resistance fall, and since the viscosity of a binder solution will become high too much if 2 million is exceeded, coating nature falls.

[0047] As for the binder constituent of this inventions 1-3, it is desirable that the rate of insoluble matter to ethyl acetate (gel molar fraction) is 20 - 50 % of the weight. This reason is that it becomes what the adhesion over thermal resistance and a foam base material, especially polyethylene foam and adhesion were secured.

[0048] Gel here points out the insoluble matter to the ethyl acetate of a binder. Carry out coating so that the thickness after drying a binder constituent solution to the mold release side of a release paper may be set to 65 micrometers, and it is made to dry for 5 minutes in a 80-degree C dryer, and it is recuperated for one week on condition that 20 degrees C and 60%RH in what stuck the mold release side of a release paper on the binder coating side further. Thus, it is the weight of the obtained binder W1 It carries out. It is weight, although it filtered with the stainless steel network of 180 meshes, the insoluble matter which remained in the network was dried in the 80-degree C drier for 3 hours and ethyl acetate was completely volatilized, after being immersed in ethyl acetate and making this **** for three days W2 It carries out. A gel molar fraction is the value acquired by the degree type.

Gel molar fraction (% of the weight) = $(W2 / W1) \times 100$ [0049] Bridge formation is inadequate in the above-mentioned gel molar fraction being less than 20 % of the weight, thermal resistance falls, if it exceeds 50 % of the weight, bridge formation will progress too much, adhesion with polyethylene foam will fall, and a tuck and adhesion will decline. It is 25 - 45 % of the weight preferably.

[0050] A softener, a plasticizer, a thickener, a CHIKUSO agent, an extending agent, a bulking agent, a pigment, a stabilizer, an antioxidant, an ultraviolet ray absorbent, a rust-proofer, etc. may be blended with the binder constituent of this invention if needed in the range which does not check the effectiveness of this invention.

[0051] It may come to carry out the laminating of at least one sort of this invention 1 thru/or the binder constituent of 4 to a front face, and the adhesion workpieces of this invention 5 may be things, such as one side adhesive tape, a pressure sensitive adhesive double coated tape, foam adhesive tape, and a pressure sensitive adhesive sheet, and may be the adhesion film or sheet which consists of the binder constituent itself obtained on a release paper by carrying out coating of at least one sort of the binder constituent of this invention, for example, without using a base material.

[0052] It is not limited especially as a class of the above-mentioned base material, for example, various rubber system foam, such as various plastics foam; natural rubber foam, such as various nonwoven fabric; polyethylene foam, such as various film; rayon systems, such as cellophane, polyethylene, polypropylene, polyester, and polystyrene, and a cellulose system, polypropylene foam, and polyurethane foam, styrene-butadiene-rubber foam, chloroprene rubber foam, and acrylonitrile-butadiene rubber foam, etc. is mentioned.

[0053] When creating an adhesion workpiece using the above-mentioned base material In order to raise further the adhesion of the binder constituent of this invention to a base material, beforehand a binder constituent to the base material side (coating side) which should be carried out coating Corona discharge treatment, In order to raise the mold-release characteristic (expansion nature) of the binder constituent from the base material side (henceforth a "non-coating side") which may perform surface treatment, such as primer coating, and does not carry out coating of the binder constituent, mold release processing may be beforehand performed to the non-coating side of a base material.

[0054] The approach of carrying out the laminating of the binder constituent to a base material has the approach of applying directly using a roll coater, a bar coating machine, a flow coater, a spray coater, a doctor blade, etc., the approach of imprinting the formed binder layer which carried out spreading desiccation to a release paper, etc. that what is necessary is just to use the approach usually performed.

[0055] Although the thickness of the binder constituent by which a laminating is carried out is not limited especially, generally its about 10-200 micrometers are [that what is necessary is to just be suitably chosen according to the purpose of the adhesion workpiece obtained an application, etc.] desirable at the thickness after desiccation.

[0056] When an adhesion workpiece is the thing which comes to carry out coating of the binder constituent to both sides of a base material, the binder constituent by which coating is carried out to each field may be the same presentation, and may differ.

[0057] although the thing or base material which uses a base material is not used for the above-mentioned adhesion workpiece -- any case -- one kind of binder constituent -- a monolayer -- or two or more layer laminating may be carried out, and two or more layer laminating of two or more kinds of binder constituents may be carried out.

[0058] Since it comes to carry out the laminating of the binder constituent of this invention, the adhesion workpiece of this invention 3 is excellent in thermal resistance and creep resistance, having the adhesion to the outstanding foam base material, and is used suitable for the extensive purpose and an application.

[0059]

[Embodiment of the Invention]

[Example] Although an example is hung up over below and this invention is explained to it in more detail, this invention is not limited only to these examples.

[0060] (Examples 1-9 and examples 1-7 of a comparison)

(1) After teaching and carrying out the temperature up of the monomers of the presentation shown in Table 1 and 2, a polymerization nature polymer, and the ethyl-acetate 81.8 weight section to the four-lot flask equipped with the polymerization agitator, the reflux cooling pipe, dropping funnel, and thermometer of an acrylic copolymer and making it flow back for 30 minutes, the benzoyl peroxide 0.1 weight section was dropped at it, and it was made to react to it for 7 hours. Subsequently, the benzoyl peroxide 0.1 weight section was dropped and it was made to react for 3 hours. The toluene 40.4 weight section was added after that, it cooled, and the acrylic copolymer solution of 45% of solid content was obtained.

[0061] (2) after carrying out addition mixing of the tackifier and liquefied tackifier of a presentation which were shown in Table 1 and 2 and diluting with toluene further in the preparation profit **** acrylic copolymer solution of a binder constituent at 40% of solid content, addition mixing of the cross linking agent shown in Table 1 and 2 was carried out, and the binder constituent solution was obtained.

[0062] (3) After carrying out coating of the creation above-mentioned binder constituent solution of foam adhesive tape so that the thickness after drying to the mold release side of a release paper may be set to 65 micrometers using a doctor blade, it was dried for 5 minutes in the 80-degree C dryer. Subsequently, using the sticking-by-pressure roller, the desiccation coat of a binder constituent was made to stick on an urethane system foam base material with a thickness of 10mm mutually, it was stuck by pressure, it was recuperated for one week by 20 degrees C and 65%RH, and foam adhesive tape was obtained.

[0063] (Examples 10-20 and examples 8-16 of a comparison)

(1) After teaching the monomer mixture of the ethyl-acetate 53.3 weight section and the first stage eye

shown in Table 3 to the polymerization agitator of an acrylic copolymer (A), a reflux cooling pipe, a thermometer, and the four-lot flask equipped with nitrogen entrainment Rhine and carrying out a temperature up to them to predetermined temperature under a nitrogen purge, the predetermined polymerization initiator was added and the predetermined time reaction was carried out. Subsequently, the monomer mixture of the second stage eye which carried out the temperature up to predetermined temperature and which was shown in Table 3 was added, and the predetermined time polymerization reaction was continued. Then, the toluene 96.7 weight section was added, it cooled, and the acrylic copolymer (A) solution of 40% of solid content was obtained.

[0064] (2) After carrying out addition mixing of the tackifier and liquefied tackifier of a presentation which were shown in the production above-mentioned acrylic copolymer (A) solution of a binder constituent and foam adhesive tape in Table 4 and 5 and diluting with toluene to 40% of solid content further, addition mixing of the cross linking agent shown in Table 4 and 5 was carried out, and the binder constituent solution was obtained. Foam adhesive tape was produced like examples 1-9 using this binder constituent solution.

[0065] After sticking on the SUS plate by having made the foam adhesive tape of evaluation (80-degree-C exfoliation holding power) each example and each example of a comparison into width of face of 25mm and sticking 1 ***** of 2kg rollers by pressure, it was recuperated by 20 degrees C and 65% RH on the 1st. Subsequently, after constructing a 50g static load as a foam adhesive tape side turns down within this oven after leaving it in 80-degree C oven for 30 minutes, and leaving it for 1 hour, the existence of fall by exfoliation was checked, and when having not fallen, exfoliation die length was measured. The example was shown in Table 1 and Table 4, and the above result was shown in Table 2 and Table 5 about the example of a comparison.

[0066]

[Table 1]

Table 1		Table 1								
		実 施 例								
		1	2	3	4	5	6	7	8	9
モノマー組成	アクリル酸ブチル	5.2				8.9	5.2			
	アクリル酸2-エチルヘキシル	4.0				—	4.0			
	アクリル酸2-ヒドロキシエチル	0.3				0.05	0.3			
	重合性ポリメタクリル酸ブチル	5				8	5			
	アクリル酸	2.7				2.95	2.7			
粘着付与樹脂	ロジンエステル1 (軟化点100℃) ※1	1.0	—	—	—	—	—	1.0	—	—
	ロジンエステル2 (軟化点125℃) ※2	—	5	1.0	—	8	5	—	5	—
	ロジンエステル3 (軟化点125℃) ※3	—	—	—	5	—	—	—	—	5
	ロジンエステル4 (軟化点135℃) ※4	—	5	—	5	8	5	—	5	—
	ロジンエステル5 (軟化点160℃) ※5	1.0	—	5	—	—	—	1.0	—	5
	石油樹脂 (融点125℃) ※6	—	—	—	—	—	5	—	—	—
	平均軟化点 (℃)	130	130	137	130	130	128	130	130	143
液状粘着付与樹脂 ※7		—	—	—	—	—	—	0.5	1.0	2.0
架橋剤	イソシアネートプレポリマー ※8	1.0	0.8	0.8	1.4	3.0	0.8	1.0	0.8	1.4
物性	80℃剝離保持力 (剝離長さmm)	ウレタン系発泡体								
		5	5	7	5	3	7	2	2	1
	ポリエチレン系発泡体									
		8	5	9	4	35	5	5	3	3
ゲル分率 (重量%)		40	40	30	40	45	35	35	35	35

[0067]

[Table 2]

		比較例									
		1	2	3	4	5	6	7	8	9	
モノマー組成	アクリル酸ブチル	57	52			57	52				
	アクリル酸2-エチルヘキシル	40									
	アクリル酸2-ヒドロキシエチル	0.3			—	0.3	—	0.3	0.7	0.3	
	重合性ポリメタクリル酸ブチル	—	5			—	5				
	アクリル酸	2.7			3.0	2.7	3.0	2.7	2.3	2.7	
粘着付与樹脂	ロジンエステル1 (軟化点100℃) ※1	10	20	—	10	10	10	—	10	10	
	ロジンエステル2 (軟化点125℃) ※2	—	—	—	—	—	—	—	—	—	
	ロジンエステル3 (軟化点125℃) ※3	—	—	—	—	—	—	—	—	—	
	ロジンエステル4 (軟化点135℃) ※4	—	—	—	—	—	—	—	—	—	
	ロジンエステル5 (軟化点160℃) ※5	10	—	10	10	10	10	—	10	10	
	石油樹脂 (融点125℃) ※6	—	—	—	—	—	—	20	—	—	
	平均軟化点 (℃)	130	100	160	130	130	130	125	130	130	
液状粘着付与樹脂 ※7		—	—	—	—	0.5	1.0	2.0	—	—	
架橋剤	イソシアネートプレポリマー ※8	1.0	1.0	1.0	—	1.0	—	1.4	1.0	5	
物性	80℃熱衝撃保持力 (別冊長さmm)	ウレタン系発泡体	*落下	落下	*落下	落下	*落下	落下	*落下	5	5
		ポリエチレン系発泡体	5	*落下	*落下	落下	*落下	落下	*落下	*落下	*落下
	ゲル分率 (重量%)		40	40	35	0	35	0	40	60	60

[0068]

[Table 3]

アクリル系共重合体 (A)			A-1	A-2	A-3	A-4	A-5	A-6	A-7
重合開始剤	1		0.3	0.3	0.4	0.3	—	0.3	0.3
	2		—	—	—	—	0.3	—	—
一段目重合	仕込み量 (重量部)		80	20	10	20	80	100	80
	混合モノマー重量%	X-1	7	100	100	50	57	57	57
		アクリル酸2-エチルヘキシル	40	—	—	49.6	40	40	40
		X-2	7	—	—	0.4	0.3	0.3	—
		アクリル酸2-ヒドロキシエチル	0.3	—	—	0.4	0.3	0.3	—
	X-3	7	—	—	—	2.7	2.7	3.0	—
		アクリル酸	2.7	—	—	—	2.7	2.7	3.0
		ドデシルメルカプタン	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	ガラス転移温度 (℃)		—	-54	-54	-70	—	—	—
	重合温度 (℃)		75	75	75	75	75	75	75
	反応時間 (hrs)		4	4	4	4	4	10	4
二段目重合	仕込み量 (重量部)		20	80	80	80	20	—	20
	混合モノマー重量%	Y-1	100	57	57	87	100	—	100
		アクリル酸2-エチルヘキシル	—	40	40	30	—	—	—
		Y-2	—	0.3	0.3	0.3	—	—	—
		アクリル酸2-ヒドロキシエチル	—	0.3	0.3	0.3	—	—	—
	Y-3	7	—	2.7	2.7	2.7	—	—	—
		アクリル酸	—	2.7	2.7	2.7	—	—	—
		ドデシルメルカプタン	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	ガラス転移温度 (℃)		-54	—	—	—	-54	—	-54
	重合温度 (℃)		85	85	88	85	85	—	85
	反応時間 (hrs)		6	6	6	6	6	—	6

[0069]

[Table 4]

		実 施 例											
		10	11	12	13	14	15	16	17	18	19	20	
アクリル系共重合体 (A)	A-1	100	100	100	100	100	100	100	100	—	—	—	
	A-2	—	—	—	—	—	—	—	—	100	—	—	
	A-3	—	—	—	—	—	—	—	—	—	100	—	
	A-4	—	—	—	—	—	—	—	—	—	—	100	
	A-5	—	—	—	—	—	—	—	—	—	—	—	
	A-6	—	—	—	—	—	—	—	—	—	—	—	
	A-7	—	—	—	—	—	—	—	—	—	—	—	
比較例	ロジンエステル1 (軟化点100℃) ※1	10	—	—	—	—	10	—	—	10	10	10	
	ロジンエステル2 (軟化点125℃) ※2	—	5	10	—	5	—	5	—	—	—	—	
	ロジンエステル3 (軟化点125℃) ※3	—	—	—	5	—	—	—	5	—	—	—	
	ロジンエステル4 (軟化点135℃) ※4	—	5	—	5	5	—	5	—	—	—	—	
	ロジンエステル5 (軟化点160℃) ※5	10	—	5	—	—	10	—	5	10	10	10	
	石油樹脂 (軟化点125℃) ※6	—	—	—	—	5	—	—	—	—	—	—	
	平均軟化点 (℃)	130	130	137	130	128	130	130	143	130	130	130	
液状樹脂含有率 (%)		—	—	—	—	—	0.5	1.0	2.0	—	—	—	
架橋剤 イソシアネートプレポリマー ※8		1.0	0.8	0.8	1.4	0.8	1.0	0.8	1.4	1.0	1.0	1.0	
物性	ウレタン系接着剤に付する80℃軟化力 (軟化長さmm)	7	9	8	7	9	5	3	3	8	7	12	

[0070]

[Table 5]

		比 較 例									
		10	11	12	13	14	15	16	17	18	
アクリル系共重合体 (A)	A-1	—	—	—	100	100	100	100	—	—	
	A-2	—	—	—	—	—	—	—	—	—	
	A-3	—	—	—	—	—	—	—	—	—	
	A-4	—	—	—	—	—	—	—	—	—	
	A-5	100	—	100	—	—	—	—	—	—	
	A-6	—	100	—	—	—	—	—	—	—	
	A-7	—	—	—	—	—	—	—	100	100	
比較例	ロジンエステル1 (軟化点100℃) ※1	10	10	10	20	—	10	—	10	10	
	ロジンエステル2 (軟化点125℃) ※2	—	—	—	—	—	—	—	—	—	
	ロジンエステル3 (軟化点125℃) ※3	—	—	—	—	—	—	—	—	—	
	ロジンエステル4 (軟化点135℃) ※4	—	—	—	—	—	—	—	—	—	
	ロジンエステル5 (軟化点160℃) ※5	10	10	10	—	10	10	—	10	10	
	石油樹脂 (軟化点125℃) ※6	—	—	—	—	—	—	20	—	—	
	平均軟化点 (℃)	130	130	130	100	180	130	125	130	130	
液状樹脂含有率 (%)		※7	—	—	0.5	—	—	—	—	2.0	
架橋剤	イソシアネートプレポリマー	※8	1.0	1.0	1.0	1.0	1.0	—	1.0	1.0	1.4
物性	ウレタン系接着剤に付する80℃軟化力 (軟化長さmm)		60	*落下	50	*落下	*落下	落下	*落下	70	75

[0071] [Note] Units other than physical properties are the weight sections.

* : it exfoliated in the foam interface.

**1: The Arakawa chemical-industry company make (100 degrees C of softening temperatures, trade name "super ester A100")

**2: The Arakawa chemical-industry company make (125 degrees C of softening temperatures, trade name "super ester A125")

**3: The Arakawa chemical-industry company make (125 degrees C of softening temperatures, trade

name "the pen cel D125")

**4: The Arakawa chemical-industry company make (135 degrees C of softening temperatures, trade name "the pen cel D135")

**5: The Arakawa chemical-industry company make (160 degrees C of softening temperatures, trade name "the pen cel D160")

**6: Mitsui Petrochemical Industries, Ltd. make (the melting point of 125 degrees C, trade name "FTR6125")

**7: the Hercules make (a trade name -- "a stevedore -- light ester 3")

**8: What has the Sumitomo Bayer urethane company make and three isocyanate radicals (trade name "coronate L55")

[0072]

[Effect of the Invention] Since the binder constituent of invention is as above-mentioned, it excels in the adhesion over a porosity base material with high expansion ratio, such as urethane foam and polyethylene foam, and excels in thermal resistance and creep resistance, and the adhesion workpiece with which coating of this binder constituent was carried out is used suitable for the extensive purposes, such as building materials and home electronics, and an application.

[Translation done.]

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(54) CURABLE COMPOSITION

(57)Abstract:

PURPOSE: To provide a low-cost elastic sealant which is excellent not only in weatherability and heat resistance but also in adhesion to a substrate or to a topcoating material and in stain resistance and has no surface tackiness.

CONSTITUTION: This curable compsn. contains a (meth)acrylic copolymer which has at least one hydroxyl group at each molecular terminal, is produced from a monomer mixture contg. a (meth)acrylic ester monomer, and has a number- average mol.wt. of 1,000-50,000 and a hydroxyl value of 10-400 and an isocyanate-terminated polyalkylene oxide.

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JAPANESE

[JP,07-010957,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM MEANS OPERATION EXAMPLE

[Translation done.]

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2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] In a hardenability constituent and a pan, especially in detail, this invention is excellent in thermal resistance, weatherability, endurance, resistance to contamination, adhesion with a base material, the paste of a coating, etc., and there is no surface tuck and it relates to a cheap elastic sealing compound.

[0002]

[Description of the Prior Art] An elastic sealing compound is an indispensable ingredient in the industries, such as construction and engineering works, and the amount used is increasing every year.

[0003] As current and an elastic sealing compound, although various things, such as a silicon system, a denaturation silicon system, a polysulfide system, an acrylic urethane system, and a polyurethane system, are used, the trouble is held, respectively and the present condition is that there is still nothing that fulfills the demand physical properties as an elastic sealing compound.

[0004] For example, the lack of adhesion to a base material although a silicon system has the outstanding weatherability and thermal resistance, It has a big fault, like that finishing of a coating cannot be performed, and a price is high. A polysulfide system It has the fault of polluting yellowing and top coat. A polyurethane system It has a fault, like that weatherability is inferior and a tuck remains in a front face, and the acrylic urethane system has a fault, like a tuck remains in a front face, and the denaturation silicon system also has a fault, like that adhesion with a base material needs bad selection of top coat, and a tuck remains in a front face somewhat.

[0005]

[Problem(s) to be Solved by the Invention] In view of such a situation, this invention makes it a technical problem to excel in the resistance to contamination which is excellent also in adhesion with a base material, and adhesion with top coat, and it not only excels in weatherability and thermal resistance, but does not have a surface tuck, and to offer a cheap elastic sealing compound.

[0006]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the hardenability constituent concerning this invention has one or more hydroxyl groups at each end, and consists of monomers which contain an acrylic ester (meta) system monomer as indispensable, and it is characterized by number average molecular weight using as an indispensable component the polyalkylene oxide (c) which carried out isocyanate denaturation of the acrylic copolymer (b) and end 1000-50000, and whose hydroxyl value are 10-400 (meta).

[0007] Each end shows the thing of the initiation end (alpha end) said by the usual vinyl polymerization, and a halt end (omega end) here, and the side chain usually contained in a vinyl system monomer is not contained in this.

[0008] Below, the hardenability constituent concerning this invention is explained.

[0009] first, as an acrylic ester system monomer which is the indispensable component of the acrylic copolymer (b) concerning this invention (meta) (meta) Although there will be especially no limit

conventionally if it is a well-known (meta) acrylic ester system monomer For example, an acrylic acid (meta); (meta) A methyl acrylate, an ethyl acrylate (meta), Butyl acrylate, acrylic-acid (meta) cyclohexyl, 2-ethylhexyl acrylate (meta), (Meta) Acrylic-acid (meta) aryl ester, such as acrylic-acid (meta) alkyl ester; (meta) acrylic-acid benzyls, such as acrylic-acid n-octyl, acrylic-acid (meta) dodecyl, and acrylic-acid (meta) stearyl; (meta) Acrylic-acid 2-hydroxyethyl, (Meta) Acrylic-acid hydroxypropyl, metaglycidyl acrylate (meta), (Meta) Acrylic-acid (meta) substituent content alkyl ester, such as acrylic-acid 2-aminoethyl and gamma-(methacryloyl oxypropyl) trimethoxysilane; (meta) Acrylic-acid methoxy ethyl, (Meta) Acrylic-acid (meta) derivatives, such as an ethyleneoxide addition product of an acrylic acid; (meta) Acrylic-acid perfluoro methyl, (Meta) Acrylic-acid perfluoro ethyl, acrylic-acid (meta) perfluoro propyl, (Meta) Acrylic-acid perfluoro butyl, acrylic-acid (meta) perfluoro octyl, (Meta) Acrylic-acid trifluoromethyl methyl, an acrylic-acid (meta) 2-trifluoro methylethyl, (Meta) Acrylic-acid JIPA fluoro methyl methyl, acrylic-acid (meta) 2-perfluoro ethyl ethyl, (Meta) Acrylic-acid 2-perfluoro methyl-2-perfluoro ethyl methyl, (Meta) Acrylic-acid TORIPA fluoro methyl methyl, acrylic-acid (meta) 2-perfluoro ethyl-2-perfluoro butyl ethyl, (Meta) Acrylic-acid 2-perfluoro hexyl ethyl, acrylic-acid (meta) 2-perfluoro DESHIRU ethyl, (Meta) (Meta) Acrylic-acid 2-perfluoro hexadecyl ethyl and gamma-(methacryloyl oxypropyl) trimethoxysilane silicon content (meta) acrylic ester system monomers are mentioned, and one sort of these may be used or may use two or more sorts together.

[0010] next, as a hydroxyl-group content polymerization nature monomer (a) concerning this invention If it is a well-known hydroxyl-group content polymerization nature monomer, although there will be especially no limit conventionally For example, acrylic-acid (meta) 2-hydroxyethyl, 2-hydroxypropyl acrylate (meta), Acrylic-acid 3-hydroxypropyl, the monochrome (meta) acrylic ester of a polyethylene glycol, (Meta) The monochrome (meta) acrylic ester of a polypropylene glycol, the poly caprolactone denaturation object of acrylic-acid (meta) 2-hydroxyethyl (trade name: plaque cel F series (Daicel Chemical Industries, Ltd. make)), (Meta) Allyl alcohol 4-hydroxy methyl styrene etc. may be mentioned, and only these one sort may be used, or two or more sorts may be used together.

[0011] Moreover, only an above-mentioned hydroxyl-group content polymerization nature monomer (a) and (meta) an above-mentioned acrylic ester system monomer may be used, and other than the above, this invention is conventionally available, even if it uses together a well-known vinyl system monomer. As conventionally well-known vinyl system monomers other than the above-mentioned hydroxyl-group content polymerization nature monomer (a) and (meta) an acrylic ester system monomer Although not limited especially, for example The monoalkyl ester of a maleic anhydride, a maleic acid, and a maleic acid, and a dialkyl ester; fumaric acid, Monoalkyl ester and dialkyl ester of a fumaric acid; Styrene, Aromatic series vinyl system monomers, such as alpha methyl styrene, methyl styrene, chloro styrene, a styrene sulfonic acid, and its sodium salt; Perfluoro ethylene, Fluorine content vinyl system monomers, such as a perfluoro propylene and vinylidene fluoride; Vinyltrimetoxysilane, Trialkyl oxysilyl radical content vinyl system monomers, such as vinyltriethoxysilane; Maleimide, Methyl maleimide, ethylmaleimide, propyl maleimide, butylmaleimide, Octyl maleimide, dodecyl maleimide, stearyl maleimide, Maleimide derivatives, such as phenyl maleimide and cyclohexyl maleimide; Acrylonitrile, Nitrile group content vinyl system monomers, such as a methacrylonitrile; Acrylamide, Amide group content vinyl system monomers, such as methacrylamide; Vinyl acetate, Vinyl ester, such as propionic-acid vinyl, vinyl pivalate, benzoic-acid vinyl, and cinnamic acid vinyl; Ethylene, Alkenes, such as a propylene; diene; vinyl chlorides, such as a butadiene and an isoprene, a vinylidene chloride, an allyl chloride, etc. are mentioned, only one sort may be used for these or they may use two or more sorts together.

[0012] Especially if it is not 0, it will not be restricted, but in order to demonstrate enough the descriptions, such as merit of the weatherability which an acrylic (meta) polymer has, as for the content of the acrylic ester (meta) system monomer in the monomer which constitutes the acrylic copolymer (b) concerning this invention (meta), it is desirable that it is 30 % of the weight or more, and it is more desirable that it is 50 % of the weight or more.

[0013] Moreover, the content of the hydroxyl-group content polymerization nature monomer in the monomer which constitutes the acrylic copolymer (b) concerning this invention (meta) will not be

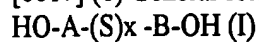
restricted especially if it is the range where the hydroxyl value of an acrylic (meta) copolymer (b) becomes 10-400.

[0014] Next, the hydroxyl value of the acrylic copolymer (b) concerning this invention (meta) must be within the limits of 10-400. A surface tack not only remains, but with [this hydroxyl group] ten [less than], the crosslinking density after hardening will run short and sufficient mechanical strength will not be obtained. Moreover, with [this hydroxyl value] 300 [or more], crosslinking density will be too high and sufficient elongation will not be acquired.

[0015] Next, the range of the number average molecular weight of the acrylic copolymer (b) concerning this invention (meta) must be 1000-50000. With [this number average molecular weight] 1000 [or less], molecular weight is too (meta) small, and it not only cannot demonstrate the good physical properties as an acrylic polymer enough, but since the distance between the points constructing a bridge after hardening is too short, sufficient elongation will not be acquired. With 50000 [or more], polymer viscosity becomes high too much and it becomes impossible moreover, to secure sufficient workability.

[0016] Next, although especially the process of the acrylic copolymer (b) concerning this invention (meta) is not restricted, it is desirable to compound by the manufacture approach as shown below.

[0017] (1) General formula (I)



(-- A and B express a divalent organic radical among a formula, respectively, and x is the integer of 2-5.)

-- under the existence of a compound (d) expressed In the approach of performing a radical polymerization initiator (f) for the polymerization of a vinyl system monomer (e) It is made to exist. the inside of the system of reaction -- a compound (d) -- under a reaction -- always -- more than 50 mol twice of a radical polymerization initiator (f) -- The manufacture approach of a polymer of having a hydroxyl group in the both ends characterized by performing said polymerization, without using substantially anythings other than a compound (d), a vinyl system monomer (e), and a radical polymerization initiator (f).

[0018] As a compound (d) in this manufacture approach Although especially limitation is not carried out, for example Hydroxymethyl disulfide, Hydroxymethyl trisulfide, hydroxymethyl tetrasulfide, 2-hydroxyethyl disulfide, 2-hydroxyethyl trisulfide, 2-hydroxyethyl tetrasulfide, 2-hydroxyethyl PENTA sulfide, 3-hydroxypropyl disulfide, 3-hydroxypropyl trisulfide, 3-hydroxypropyl tetrasulfide, 2-hydroxypropyl disulfide, 2-hydroxypropyl trisulfide, 2-hydroxypropyl tetrasulfide, 4-hydroxy butyl disulfide, 4-hydroxy butyl trisulfide, 4-hydroxy butyl tetrasulfide, 8-hydroxy octyl disulfide, Hydroxy ARUKIRUJI, such as 8-hydroxy octyl trisulfide and 8-hydroxy octyl tetrasulfide, Tori, a tetrapod or PENTA sulfides, and these ethyleneoxide addition products; 2 and 2'-dithio diglycolic acid, 2 and 2' Tori thiodiglycolic acid, 2, and 2'-tetra-thiodiglycolic acid, 3 and 3'-dithio dipropionic acid, 3, and 3' Tori thiodipropionic acid, 3 and 3'-tetra-thiodipropionic acid, 3, and 3'-PENTA thiodipropionic acid, 4 and 4'-dithio -- a jib -- tongue acid, 4, and 4'-TORICHIO -- a jib -- tongue acid, 4, and 4'-tetra-thio -- a jib -- a tongue acid --